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## REVIEWS.

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*Monographs of the U. S. Geological Survey, vol. XVII. The Flora of the Dakota Group.* A posthumous work by LEO LESQUEREUX. Edited by F. H. KNOWLTON. 256 pp., 66 plates. Washington, 1892.

The posthumous issue of this product of many years of labor, including some of the best work of one who for many years was distinguished as the highest authority in American paleobotany, is a matter of great interest to both paleontologists and biologists, since it renders the plant remains of the Dakota group, one of the oldest dicotyledon-bearing terranes, the most completely-elaborated and best-known flora, perhaps without exception, of any restricted formation in the world. Within its two hundred and fifty-six quarto pages, four hundred and sixty species are described, or, in the case of those concerning which no new observations had been made since the publication of his "*Cretaceous Flora*" and "*Cretaceous and Tertiary Floras*," enumerated with references to his earlier works. The drawings, a considerable number of which were unfinished at the time of the author's death, occupy sixty-six plates.

Of the flora, as a whole, over ninety per cent. are dicotyledons, one and three-tenths per cent. ferns, three and one-half per cent. conifers, and two and one-half per cent. cycads. In this overwhelmingly dicotyledonous flora, most of our American living tree-families have their representatives. While going over the descriptions and figures it will seem to some readers that the number of species, and particularly of varieties, is, in some instances, too great, there being for example, four varieties of *Salix proteaefolia*, seven of *Viburnum Lesquereuxii*, and fifteen of *Betulites Westii*, especially since we are left to infer in the latter case that all have the same rather indefinite habitat, "Ellsworth County, Kansas." But, while it is probably true that some of the variations do not vary more than the leaves on a single tree, still it should be borne in mind that that period in the history of the dicotyledons, soon after their first appearance in the Cretaceous, was one of immense diversity of form and great modification of character; and, although, as Professor

Lesquereux himself suggested, their differentiation might, under other circumstances, be "hazardous," yet the discrimination of the forms furnishes a better paleontological basis for the interpretation of modern types, as well as a higher degree of definition, for the use of paleontological stratigraphy.

At the close of the memoir, the broad range of the author's knowledge and paleobotanical experience is well shown in some thirty pages, devoted to an "Analysis" of the flora of the group. From this analysis, which is of great value to the biological paleontologist, he reaches the conclusions that, although but one-fourteenth of the species found in the Dakota group are also found in the Atane beds of Greenland, yet, considering the remoteness of the regions, the close relationship of the floras, and the difference in latitude, and, perhaps, in soil, the proofs are "really conclusive" of the synchronism of the two formations; "that most of the types of the arborescent flora of North America were present in that of the Dakota group, and that most of them had left remains of allied specific or generic forms in the intermediate periods," so that the flora of this continent is indigenous; and that "all the plants of the American Cenomanian, except those of *Ficus* and *Cycads*," which, he explains, may be omitted, "might find a congenial climate in the United States between  $30^{\circ}$  and  $40^{\circ}$  of latitude," a continued uniformity of climate, causing "the preservation of the original types of the flora, subjected to some modification of their original characters, without destroying them or forcing their removal by the introduction of strange or exotic forms."

Although a great proportion of the species found in any given locality are not reported from any other point, it will readily be understood why no attempt is made to work out any floral horizons in the Dakota group, when the reader observes that, while a portion of the species are reported from among a dozen localities, and a few specimens come from Minnesota and Nebraska, owing to the circumstances attending their collection and accumulation in Professor Lesquereux's hands, a large part, perhaps the greater number of them, have no more restricted habitat than "Ellsworth County, Kansas," or merely "Kansas." It is noted, however, that in one or two instances no change in the associations of the species was met in descending fifty or seventy-five feet in the series. The geological interest of the work would have been further increased if collections from the southwestern extension of the group had also been made and studied with the rest.

In the interpretation and elaboration of the author's last notes, some of which were fragmentary, and written after the lamented writer was unfit for work, as well as in interpreting and rearranging the extensive additions or modifications to the manuscript, Professor Knowlton, the editor, has shown great discretion, making no alterations or enlargements other than those necessary to the expression of the author's intended meaning, or for priority or consistency, such alterations being indicated by brief foot-notes. To him we are also indebted for a valuable tabulation of the geological and geographical distribution of the species, a compilation involving much time and consultation of the literature of the science.

It is unfortunate that those plates with washed drawings, made under Professor Lesquereux's personal supervision for the lithographer, should have, for financial reasons, been sacrificed, even though the photo-gravure work is of good quality. Much distinctness of the nervation is lost, as may be noted in a comparison with the last plates in the volume, prepared especially for the cheaper process. Although, as in too many of the paleontological publications of the United States Geological Survey, the date on the title page is earlier than the actual publication of the work, the date (1892) on the outside page is, in this instance, correct.

DAVID WHITE.

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*Cretaceous Fossil Plants from Minnesota.* By LEO LESQUEREUX. Vol. III., Final Report on Geology and Natural History Survey of Minnesota. Feb. 15, 1893, pp. 1-22; pl. A. B.

The distinguished author of this short paper died in 1889, yet the evidences of his untiring energy are still coming to hand. This paper, bears internal evidence of having been prepared about the time of the completion of his *Flora of the Dakota Group*, which has likewise only just been published. It is prefaced by a short interesting account of the introduction and development of plant-life, illustrated by a wealth of examples and statistics.

Cretaceous fossil plants have been known from Minnesota for many years, in fact, several species were obtained by members of the Hayden survey, but this is the first complete systematic review of them. They come mostly from New Ulm, in Redwing Co., and Goodhue township in Goodhue Co. The amount of material examined was very scanty, there having been but fifty-five specimens, yet the richness of the flora is shown by the fact that there are twenty-eight species. Of this num-